

Leave No Trace

The Leave No Trace Center for Outdoor Ethics is a national nonprofit organization dedicated to promoting and inspiring outdoor recreation through education, research, and partnerships. Leave No Trace (LNT) builds awareness, appreciation, and respect for wildlands. Extensive information about the principles of Leave No Trace, LNT membership, research, teaching resources, learning activities, training, newsletters, and other information is located on the Internet at www.lnt.org. For National Park Service employees, **InsideNPS** (www.inside.nps.gov) offers current information on the NPS partnership with Leave No Trace, including NPS contacts and research articles.



Basic Principles of Leave No Trace

- Plan Ahead and Prepare
- Travel and Camp on Durable Surfaces
- Dispose of Waste Properly
- Leave What You Find
- Minimize Campfire Impacts
- Respect Wildlife
- Be Considerate of Other Visitors

Development of the U.S. Leave No Trace Program: A Historical Perspective

By Jeffrey L. Marion and Scott E. Reid, January 2001

(Jeff Marion is the Leader of the Cooperative Park Studies Unit, Patuxent Wildlife Research Center, U.S. Geological Survey and a Board Member of The Leave No Trace Center for Outdoor Ethics and Scott Reid is Education and Projects Manager, Leave No Trace Center for Outdoor Ethics)

Introduction

The goal of the U.S. Leave No Trace educational program is to avoid or minimize impacts to natural area resources and help ensure a positive recreational experience for all visitors. America's public lands are a finite resource whose social and ecological values are linked to the integrity of their natural conditions and processes. Land managers face a perennial struggle in their efforts to achieve an appropriate balance between the competing mandates to preserve natural and cultural resources and provide high quality recreational use. Visitor education designed to instill low impact ethics and skills is a critical management component and is seen as a light-handed approach that can reduce the need for more direct and regulatory forms of management.

"Wilderness management is 80 to 90 percent education and information and 10 percent regulation."

—Max Peterson, Chief of the U.S. Forest Service, 1985

"Education . . . is a preemptive strike . . . to teach the American people how to enjoy the wilderness without destroying it. All other methods merely try to repair the damage after it is done. Stronger wilderness education programs would dramatically decrease the need for law enforcement and cleanup."

—James Bradley, former staff member, Subcommittee on National Parks and Public Lands,
U.S. House of Representatives

This paper describes the historical development of the U.S. Leave No Trace (LNT) educational program. It begins with a review of the need for the program and follows its conception and early development in the 1970s, revitalization in 1990, creation of Leave No Trace, Inc. in 1994, and the current status of the Leave No Trace Center for Outdoor Ethics. The paper concludes with a discussion of the elements that have made it successful and recommendations for the development of similar educational programs.

The Need

America's recreation lands, including private, local, state and federal holdings, are being used and enjoyed by more and more people. The most dramatic increases in outdoor recreation occurred in the 1960s when hiking, camping, and backpacking first became popular. For example, use of National Forest primitive areas and wilderness tripled during the 1960s, and public land visitation continues to increase. Recreation visits to the U.S. Forest Service lands have jumped from 4.6 million in 1924 to 900 million in 1999. Similarly, recreation visits to National Park Service areas were 33 million in 1950, increasing more than five-fold to 172 million in 1970, with more modest increases to 258 million in 1990, and 287 million in 1999.

This magnitude of recreation visitation periodically raises the issue in the popular media of whether Americans are "loving their parks to death." One hiker venturing off the trail or one group creating a new campsite may seem of little significance, but the combined effects of millions of such instances leave a substantial and cumulative mark on the land. Trampling by foot and horse traffic causes loss of vegetation cover and change in species composition, exposure, compaction, and erosion of soil, damage to trees, campfire scars, litter and improperly disposed human or dog waste (Hammitt and Cole 1998, Leung and Marion 2000). Such changes can also degrade the quality of outdoor experiences because they are most evident along trails and at recreation or camping sites where visitors spend the majority of their time.

The expansion and proliferation of visitor-created campsites and trails also increase the aggregate area of human disturbance and fragment wildlife habitat. Disturbance of wildlife can displace them from critical foraging or nesting habitats while individuals that obtain human food become beggars or nuisance animals that must be relocated or killed (Knight and Temple 1995). Archaeological and cultural resources are also at risk from visitors who climb around to explore ruins or take artifacts like pottery shards as souvenirs. Increasing recreational visitation also causes crowding along trails and at campsites, which diminishes solitude. Incompatible activities or encounters with discourteous visitors can lead to conflicts between groups.

Unfortunately, research has shown that the majority of recreation-associated resource impacts occur with initial or low levels of use. For example, on campsites in the Boundary Waters Canoe Area Wilderness, 95 percent of the total loss of tree seedlings and 61 percent of the increase in soil compaction occurred on sites receiving just 12 nights of use per year (Marion and Merriam 1985). Experimental trampling studies have consistently documented curvilinear responses between the amount of trampling and the severity of damage to vegetation and soils (Cole 1993, 1995). Impacts occur rapidly at initial or low use levels but the rate of loss diminishes as maximum change approaches 100 percent. These studies also demonstrate substantial differences in the ability of different vegetation and soil types to resist trampling damage and in their ability to recover from disturbance (Cole 1987, Leung and Marion 2000). Some important implications of these findings are that impacts can be effectively minimized by concentrating recreational traffic on the most resistant surfaces, including rock, sand, bare soil, snow, and grassy ground covers.

Sustaining outstanding natural resource conditions and recreational opportunities are primary goals for public land managers, most of whom operate under the dual "preservation" and "use" legal mandates. Research has demonstrated that resource degradation is an inevitable consequence of natural area visitation. Similarly, as visitor use expands, so too will visitor encounters, jeopardizing opportunities for solitude. The challenge for managers is to eliminate avoidable impacts and to minimize those impacts that are unavoidable. For example, visitors who substitute camping stoves for campfires avoid a host of resource impacts related to the gathering and burning of firewood. Managers can achieve such ends through regulations, i.e., prohibiting campfires, or through education, i.e., highlighting campfire-related resource impacts and the advantages of using stoves. Effective educational interventions can enhance visitor outdoor ethics, encouraging visitors to modify their own behavior through the adoption of low impact practices. Such indirect approaches preserve visitor freedom from regulations and can also delay or forgo the need to limit visitor use.

Educational programs such as LNT provide a vehicle for promoting awareness of recreation impacts and encouraging visitors to become knowledgeable about how to reduce it. To halt and reverse current trends of recreation-caused resource degradation, visitors must become aware of their responsibility to reduce

their impact on the land and to the experiences of other visitors. Low impact ethics and skills need to become a standard code of conduct that promotes the stewardship practices necessary to protect the ecological and social health of recreation lands.



Program Conception and Early Development

As wildland use continued to expand in the 1960s, 70s and 80s, visitors to public lands began to witness the degradation of their favorite trails and campsites. The development of low impact hiking and camping practices occurred incrementally over this time period. The federal agencies, notably the U.S. Forest Service (USFS) but also the Bureau of Land Management (BLM), and the National Park Service (NPS) developed numerous brochures during these years variously called Wilderness Manners, Wilderness Ethics, Minimum Impact Camping, and No-Trace Camping. In the late 60s and early 70s wilderness managers had initially applied regulations to address visitor impact problems but realized a need to develop an educational program to supplement the regulations. In 1979, Jim Bradley, a USFS wilderness specialist in the Pacific Northwest, wrote about the need for an educational approach for managing recreation impacts (Bradley 1979). He noted that a purely regulatory approach is inappropriate because: (1) regulations antagonize the public rather than win their support, (2) most impacts are not from malicious acts, they result from an insensitivity to the consequences of one's actions and from a lack of knowledge regarding appropriate low impact practices, and (3) enforcement of regulations is difficult in wildlands due to their large and remote nature.

USFS wilderness managers developed an educational program in the mid-70s that emphasized personal communication at busy wilderness accesses. Wilderness Information Specialists (WIS's) sought out visitors using a friendly hospitable approach to provide information that included no-trace travel and camping tips. These programs evolved in the early 80s into a more formal "No-Trace" program that relied on a humanistic approach emphasizing the cultivation of new wilderness ethics and more sustainable no-trace travel and camping practices. The success of this program led to interagency coordination and in 1987 the USFS, NPS, and BLM cooperatively developed and distributed a pamphlet titled Leave No Trace Land Ethics.

During this time period a number of books and papers were also written about wildland ethics and minimum impact camping practices. Books include *The Wilderness Handbook* (Petzoldt 1974), the Sierra Club's *Walking Softly in the Wilderness* (Hart 1977), *Backwoods Ethics: Environmental Concerns for Hikers and Campers* (Waterman and Waterman 1979), and *Soft Paths* (Hampton and Cole 1988). These books highlighted the advantages of low-impact camping and actively promoted a 'clean camping' crusade. They also provided 'how to' advice on travel and camping practices that would help recreationists lessen their individual impact. Similarly, the scientific community contributed a number of papers in conference proceedings and journals. For example, Fazio's paper *Information and education techniques to improve minimum impact use knowledge in wilderness areas* in the 1978 *Recreational Impact on Wildlands conference* (Fazio 1979), *Managing campfire impacts in the backcountry* (Cole and Dalle-Molle 1982), *Wilderness campsite selection: What should users be told* (Cole and Benedict 1983), and *Low-impact recreational practices for wilderness and backcountry* (Cole 1989).

Development of a National Program

A lack of national leadership, funding, and training had limited the effectiveness of early minimum impact educational efforts in the 1970s and 80s, including a pilot educational effort with the Boy Scouts of America and the BLM in the High Uintas Wilderness area in Utah. By 1990 the clear need for visitor education, coupled with increasing knowledge about visitor impacts from research, prompted the USFS to approach the National Outdoor Leadership School (NOLS) to develop hands-on minimum impact training. (This training for land managers would eventually develop into the present day Master Educator course.) The "Leave No Trace" phrase had been designated within the USFS as the name for minimum-impact messages targeted to non-motorized recreational activities. The intent was to promote a single message in the place of various permutations developed over the years.

Also in 1990, the USFS convened a committee to discuss the potential for a national program. The goal in promoting this phrase consistently was to develop the message in much the same way as the successful Smokey Bear (forest fire) and Woodsy Owl (litter) campaigns. The USFS had created a similar national program known as Tread Lightly in 1985 to provide a focus for educational messages geared to motorized visitors (www.treadlightly.org, 800-966-9900).

The USFS formalized a partnership with NOLS to develop a written LNT educational curriculum for wildland visitors. NOLS agreed to this offer in 1990 and a Memorandum of Understanding (MOU) was signed with the USFS in 1991. NOLS is a nonprofit school founded in 1965 “to be the leading source and teacher of wilderness skills and leadership that serve people and the environment.” NOLS courses visit remote backcountry and wilderness settings and are generally one to three months in duration. The school has long been a recognized leader in developing and teaching minimum impact hiking and camping practices. This knowledge was compiled and published in the book *Soft Paths* by Bruce Hampton and David Cole in 1987 (revised in 1995). NOLS is based in Lander, Wyoming but has branch schools in many other states and countries.

NOLS’ involvement in the LNT program marked the beginning of the partnership model that continues to the present day. NOLS was instrumental in working with the USFS to make the program science-based by collecting relevant scientific literature and consulting with scientists in the review and development of low impact hiking and camping skills. NOLS also developed the ethics and experiential training aspects of the LNT program, the capstone of which is a five-day Master Educator course for land managers, outfitters, outdoor educators, and others. The first LNT Masters course was taught to agency staff in the Wind River Mountains of Wyoming in September 1991. NOLS conducted five Masters courses in 1992, including one for non-agency personnel.

“We have long recognized education as the best strategy for reversing the trend of damage to wilderness and undeveloped areas caused by recreation visitors... Accordingly, the Forest Service developed and has actively sponsored Leave No Trace as our outdoor ethics program for non-motorized users . . .”

—F. Dale Robertson, former Chief of the U.S. Forest Service, letter to regional foresters, April 1992

As land managers learned of the successful educational partnership between the USFS and NOLS, other agencies became interested in participating in the emerging national program. The Bureau of Land Management (BLM) formally joined the partnership in May, 1993, followed by the National Park Service (NPS) and U.S. Fish and Wildlife Service (USFWS) in 1994. A new MOU was signed in 1994 to formalize the LNT program partnership between USFS, NOLS, BLM, NPS and the USFWS. The MOU committed the federal agencies to provide overall steering and direction for the national program, with NOLS supplying curricula, training, and the development and distribution of LNT information. NOLS continued to manage the program by producing and selling brochures, videos, posters, and other educational materials via a toll-free number and a website.

NOLS also worked with the agencies and scientists to develop a Mission Statement, Strategic Goals, and eight LNT Principles (providing a focus for more specific educational practices). The mission statement called for the development of a nationally recognized minimum impact backcountry educational system that would educate wildland user groups, federal land management agencies and the public through training and educational materials. Strategic goals focused on the development of high quality, science-based educational materials and courses for selected target regions and recreational activities, and networking to disseminate educational ideas and programs nationwide.

For each target region and activity, NOLS has also developed comprehensive Master’s course curricula and a series of LNT Outdoor Skills & Ethics (S&E) booklets. The first 14-page booklet was produced in 1992, complementing and eventually replacing an LNT pamphlet and booklet set created by the USFS in 1992 in cooperation with the BLM, NPS, and the Izaak Walton League. Each year additional S&E volumes have been added to the series, which currently numbers 16. The S&E series are developed through a comprehensive process involving the integration of research findings, backcountry travel and camping expertise from the target region and activities, and consultations with land managers from different agencies in each area. The booklets are written to convey the most effective LNT travel and camping

practices while instilling an abiding respect and appreciation for wild places and their inhabitants. The rationale for each practice and the need to temper their application with good judgement is emphasized, along with the need for visitors to assume the responsibility to educate themselves and apply the learned skills.



Creation of Leave No Trace, Inc.

Although NOLS provided successful leadership in guiding development of the interagency LNT program, partnerships with other educational organizations and adequate funding from the outdoor industry remained critical constraints on program growth. Direct federal funding of the LNT program has always been quite limited and is often tied to specific projects. Land management agencies and NOLS recognized a need to involve outdoor product manufacturers, retail stores and other outdoor education organizations in the LNT program. Accordingly, in November 1993, an outdoor recreation summit was convened involving NOLS, the Outdoor Recreation Coalition of America (ORCA), the Sporting Goods Manufacturing Association (SGMA) and other outdoor manufacturing representatives. At the summit, these groups assessed their support of the LNT program's partnership concept and the creation of a nonprofit organization.

LNT, Inc. was registered as a 501(c)(3) nonprofit educational program in 1994 and rapidly gained momentum with the support of 24 agency, commercial, and nonprofit partners. Fund-raising dominated the organization's agenda during the initial years. Seed money to start LNT, Inc. came from NOLS, SGMA and ORCA. By 1996 the organization had two full-time staff and a budget of \$108,425 supported largely from 35 outdoor recreation manufacturers and retailers. The organization's structure includes a Board of Directors, LNT Partners, and LNT Members. The bylaws established a Board of Directors as the policy-setting arm of the program. The Board numbered eight individuals in 1995, representing the federal agencies (non-voting), NOLS, science, and other nonprofit organizations. LNT Partners are corporations and organizations interested in supporting the LNT program through visible participation, sponsorship and support of LNT information dissemination. LNT Members are private individuals who use public lands. Members are asked to ensure that their personal outdoor recreation practices are consistent with LNT skills and ethics and to assist in training others.

The LNT Educational Model emphasizes the development and dissemination of effective and accurate LNT skills and ethics. The knowledge and expertise for this model is gleaned from the federal agencies involved in LNT, scientific research, industry, NOLS and other outdoor educators. Core LNT literature includes the Skills & Ethics booklet series and LNT plastic reference tags that list the principles and core statements describing low impact travel and camping practices. Training opportunities include a five-day master's course, a two-day trainer course, LNT workshops, and public contacts:

- **Master Educator Course** - provides comprehensive coverage of LNT skills, ethics, and teaching practices, including four days of experiential learning in a backcountry setting. Intended for agency staff and outdoor educators who will train others to train the public.
- **Trainer Course** - an abbreviated version of the Master's course for individuals who will be training the public directly, including agency staff, youth group leaders, and outdoor adventure program staff.
- **Workshops** - formal but shorter duration LNT instruction, such as an afternoon session for Boy Scouts or an evening campfire presentation.
- **Public Contacts** - informal LNT instruction in visitor centers, at trailheads, and in the backcountry.

Current Status

Since its creation, the national LNT program has grown steadily in staffing, funding, educational materials and national visibility. The Leave No Trace Center for Outdoor Ethics currently has 9 full time staff (see Appendix A), with the continuing strong participation of the federal agencies and partners such as NOLS (4 Outreach Office staff), and the Appalachian Mountain Club (1 Education Office staff), a new training partner in 1999. The Leave No Trace Center for Outdoor Ethics' budget has grown from \$108, 425 in 1995 to \$630,000 in 2000. The LNT principles, revised twice since the program's creation, now number seven (see text box). Educational materials include a series of 16 Skills & Ethics booklets on environments ranging from Tropical Forests to Deserts and Canyons to the Alaskan Tundra, and for recreational

activities as diverse as caving, rock climbing, and backcountry horse use. One booklet, several pamphlets, and a video have been prepared in Spanish for use in Central and South American countries. The program's national visibility and success are addressed in a later section.

The current mission of the Leave No Trace Center for Outdoor Ethics is to promote and inspire responsible outdoor recreation through education, research and partnerships. This mission has evolved from the program's genesis, with its focus on wilderness and backcountry visitation, to also address recreation use in more accessible "frontcountry" settings (e.g., car campgrounds, day-use areas, and urban parks). This shift was made to address growing problems with resource and social impacts such as dogs and dog waste management, litter, graffiti, and visitor crowding and conflict in more developed recreation settings. Non-motorized or human-powered recreational activities remain the target audience, however, which complements parallel educational efforts by the Tread Lightly program that address motorized recreational activities.

The current composition of the Leave No Trace Center for Outdoor Ethics Board of Directors reflects the changing nature of the program. Corporate representatives have now joined the members from the federal agencies, nonprofit organizations, and outdoor educators. Past and present representation on the Board of Directors includes: USFS, BLM, NPS, U.S. Geological Survey, NOLS, the Outdoor Recreation Coalition of America, the International Mountain Biking Association, Colorado State Parks, Walt Disney Corporation, *Sports Afield* Magazine, Boy Scouts of America, Subaru of America, and others.

Current bylaws allow up to 12 voting Board members who may serve for two consecutive three-year terms. The Executive Director of the Leave No Trace Center for Outdoor Ethics is elected by a majority vote of the Board. There are three designated standing committees including an Executive Committee, Advisory Committee and Education Review Committee. Of the three committees, the Executive Committee is comprised totally of Board members while the other two report to the Board, but have non-Board members. The Executive Committee consists of the board officers (Chair, Treasurer, and Secretary) and the Executive Director. The Advisory Committee consists of federal land managers and other members who assist the Corporation and its Board in developing an operating plan for the LNT program and implementing and promoting LNT. The Education Review Committee is comprised of outdoor educators, land managers, and scientists and oversees LNT training efforts, curriculum development, and educational material production.

As a nonprofit organization, the Leave No Trace Center for Outdoor Ethics seeks funding from private donors. The majority of the Leave No Trace Center for Outdoor Ethics' funding is generated from grants and corporate sponsors. Grants are applied for and received throughout each fiscal year. Commercial sponsors are asked to contribute each year based on the company's total annual sales (e.g., a company with sales of \$25-49 million is asked to contribute \$5,000). In return, corporate sponsors are highlighted in LNT newsletters and publicity materials. Sponsors are permitted to use LNT educational materials, the LNT logo and other promotional items. Financial support demonstrates an organization's commitment to preserving the condition of public lands and the quality of recreational experiences to be found there.

Although the financial donations of partners are essential to the LNT program's success, so too are the temporal donations of thousands of volunteers. Individuals who have completed the Master and Trainer courses commonly volunteer their time to present LNT information to interested groups. Targeted audiences include youth groups, retail store employees, guides, and school classes. Federal agency staff also devotes considerable time conveying LNT information to area visitors, user groups, and schools and provides numerous LNT messages in forest and park literature and on trailhead bulletin boards.

The LNT website, managed by NOLS, has become an important conduit for LNT information as the Internet has become more publicly accessible. The website (www.lnt.org) provides current information on courses, educational skills and ethics literature, research, LNT partners, and more. Application forms for LNT courses, scholarships and material donations are also accessible. The content of all LNT materials, including the Skills and Ethics booklets and succinct reference tags, is posted on the website and

can be downloaded for printing and distribution. This broad access to all of the LNT educational material underscores the overall intent of the LNT program. Namely, to provide accurate, science-based information for all outdoor recreationists.



Material sales and distribution of printed literature has increased steadily since the Leave No Trace Center for Outdoor Ethics inception. As of September 2000, materials sales are at an all time high. Year to date, 50,000 Skills and Ethics booklets and 250,000 plastic reference tags have been distributed; over 100,000 people have been formally trained in LNT skills and ethics; and the LNT website has registered more than 100,000 visits. Year to date, an estimated 10.5 million people have received an LNT "impression" (defined as an exposure to a logo, sign, booklet or training). Partnership numbers are also at an all time high, with 239 corporate partners, and four federal agency partners actively involved in the LNT program. In 1999, the Boy Scouts of America developed a patch recognition program for Scouts that complete a standard level of LNT education. Since initiation of the program, over 11,000 patches have been distributed. Statistics and trends such as these provide one measure of the program's success.

To date, 1,122 individuals have received LNT Master's course training, including staff from the USFS (254), BLM (121), NPS (107), USFWS (4) and from many other organizations such as the Boy Scouts, Girl Scouts, Backcountry Horsemen, Outward Bound, YMCA, and university outdoor educators. Individuals from a number of other countries have also completed the course: Canada, Mexico, Chile, Columbia, Argentina, Venezuela, Brazil, Finland, Holland, Kenya, Japan, and Australia.

Another measure of LNT's effectiveness is increased visitor knowledge of LNT skills and ethics and a per-capita reduction in impacts to resource conditions and to the experiences of other visitors. A pilot research effort is currently underway to begin empirical evaluations of the program's effectiveness. An LNT Laboratory Project was initiated in the San Juan Mountains of southwest Colorado in 1999. The goal of this project is to measure the effect of LNT educational efforts on both visitor behavior and recreation site resource conditions. In addition to focusing LNT research on several sites in Colorado, the LNT Laboratory will supplement area LNT training and outreach efforts. Plans are underway to replicate the LNT Laboratory model in a different region of the country beginning in 2002. Limited empirical research on the effectiveness of educational programs has been conducted in the U.S. However, administrators and scientists have highlighted the need for such efforts and methods for their evaluation have been described (Matthews and Riley 1995, Passineau and others 1994).

A variety of diverse educational programs and outreach initiatives continue to expose wildland visitors to LNT skills and ethics. One such effort is the Subaru/LNT Traveling Trainer program. This strategic LNT partnership funds two teams of trained ambassadors to travel the United States educating land managers, retail store staffs, youth groups, outfitters and others in LNT. This high-profile education program effectively brings a convenient, mobile training option to interested parties across the US.

In 1999, the Appalachian Mountain Club (AMC) joined LNT, Inc. as a provider of LNT Master courses. Founded in 1876, the AMC has 84,000 members in the Northeastern U.S. and is the country's oldest and most active conservation and recreation organization. The AMC sponsors a wide range of activities including volunteer-led projects and outings, as well as trail management, public service programs, research, outdoor education, and publications. With the presence of the AMC in the eastern U.S. and NOLS in the west, LNT has educational strongholds in both halves of the country. For individual states nationwide, the Leave No Trace Center for Outdoor Ethics has recently developed a State Coordinator program that allows volunteers to guide LNT efforts within their respective states in exchange for donated material and logistical support. This state-based presence ensures an active network of dedicated educators with local knowledge and contacts to spread the LNT message.

Based on historical donations of time, money and intellectual property, NOLS has owned the copyright to all LNT written materials since their first printing. As the information has gained broader appeal, numerous requests have been made to print all or part of existing LNT materials in a variety of publications. To ensure adequate access to LNT information and appropriate recognition of intellectual property, NOLS and LNT have agreed to share the copyright to the LNT Skills and Ethics series. To

ensure consistency of message and copyright recognition, use of copyrighted information for printing, distribution and sale is limited to those individuals and organizations that obtain permission from the Leave No Trace Center for Outdoor Ethics. However, all LNT information has been made available for viewing and downloading on the LNT website. The program's goal has always been to make this information accessible and broadly available for distribution and use by the public.

Finally, LNT literature continues to be developed by the scientific community, agencies, and other authors. Three texts on recreation impacts have been written (Hammit and Cole 1998, Knight and Gutzwiller 1995, Liddle 1997), along with a paper summarizing visitor impact studies in wilderness (Leung and Marion 2000). Doucette and Cole (1993) provided a comprehensive guide to alternative techniques for visitor education and Parker (1995) offers a guide to outdoor ethics-related programs. Agencies contributed to *Teach Leave No Trace: Activities to teach responsible backcountry skills* (BLM 1996) and *Low impact food hoists* (Vachowski 1994). A number of new books on low impact hiking and camping techniques have been published, including a revision of *Soft Paths* (1995), *The Basic Essentials of Minimizing Impact on the Wilderness* (Hodgson 1991), *Wild Country Companion* (Harmon 1994), *Leave No Trace: Minimum Impact Outdoor Recreation* (Harmon 1997), and *Leave No Trace: A Guide to the New Wilderness Etiquette* (McGivney 1998).

The Future

The partnership triangle between the federal land agencies, NOLS, and the Leave No Trace Center for Outdoor Ethics, with its corporate and retail supporters, has been an exceptionally successful model that continues to serve the program well. Future success requires expanded training, literature dissemination, and publicity to reach a greater proportion of the public with consistent educational messages. As agency participation, corporate activities and publicity expand further we expect that visitor awareness of LNT educational skills and ethics will increase. Consistency, repetition, and unified support are critical to the long-term success of the program.

Other countries have also begun adopting or adapting the LNT program or have developed their own educational counterparts. For example, NOLS staff have worked with managers and organizations in Mexico and other Central and South American countries to initiate "No Deje Rastro" (Leave No Trace) programs. Many of the educational materials have been translated into Spanish and a number of LNT Master's courses in Spanish have been offered.

This paper traced the development of the LNT educational program in the U.S. and offers some insights into what factors have contributed to the program's expansion and success. Such information may assist other countries in developing their own programs or initiating ties and adaptations of the U.S. LNT model.

Leave No Trace Staff

For a listing of current Leave No Trace staff and board members, visit their website at www.lnt.org. National Park Service employees can also locate national and regional contacts at www.inside.nps.gov.

Contact:

Leave No Trace Center for Outdoor Ethics
P.O. Box 997
Boulder, CO 80306

For shipping:
Leave No Trace Center for Outdoor Ethics
2475 Broadway
Boulder, CO 80304

Toll Free: (800) 332-4100
Tel: (303) 442-8222
Fax: (303) 442-8217

Detailed Principles of Leave No Trace



I. Plan Ahead and Prepare

Adequate trip planning and preparation helps backcountry travelers accomplish trip goals safely and enjoyably, while simultaneously minimizing damage to the land.

Pre-Trip Planning

Poor planning often results in miserable campers and damage to natural and cultural resources. Rangers often tell stories of campers they have encountered who, because of poor planning and unexpected conditions, degrade backcountry resources and put themselves at risk.

Why is Trip Planning Important?

You may want to add additional answers to this list:

- It helps ensure the safety of groups and individuals.
- It prepares you to *Leave No Trace* and minimizes resource damage.
- It contributes to accomplishing trip goals safely and enjoyably.
- It increases self-confidence and opportunities for learning more about nature.

Seven Elements to Consider When Planning a Trip

1. Identify and record the goals (expectations) of your trip.
2. Identify the skill and ability of trip participants.
3. Select destinations that match your goals, skills, and abilities
4. Gain knowledge of the area you plan to visit from land managers, maps, and literature.
5. Choose equipment and clothing for comfort, safety, and *Leave No Trace* qualities.
6. Plan trip activities to match your goals, skills, and abilities.
7. Evaluate your trip upon return note changes you will make next time.

Other Elements to Consider

When planning a trip you may want to add your own ideas to this list:

- weather
- terrain
- regulations/restrictions
- private land boundaries
- average hiking speed of group and anticipated food consumption (leftovers create waste which leaves a trace!)
- group size (does it meet regulations, trip purpose and Leave No Trace criteria?)
- all Leave No Trace principles

Meal Planning

Meals are another element to trip planning that can have a profound effect on the impact a group has on a backcountry area.

Benefits of Good Meal Planning

- Reduced trash
- Reduced pack weight, resulting in faster hiking times and less fatigue
- Reduced dependence upon campfires for cooking.

One-Pot Meals and Food Repackaging

- Planning for one-pot meals and light weight snacks requires a minimum of packing and preparation time, lightens loads and decreases garbage. One-pot meals require minimal cooking utensils and eliminate the need for a campfire. Two backpack stoves can be used to cook all meals for large groups if you have two large pots (one large pot can be balanced on two stoves when quick heating is desired). Remember, a stove Leaves No Trace.
- Most food should be removed from its commercial packing and placed in sealable bags before packing your backpacks. Sealable bags secure food and reduce bulk and garbage. Empty bags can be placed

inside each other and packed out for reuse at home. This method can reduce the amount of garbage your group must pack out at the end of the trip and eliminate the undesirable need of stashing or burying unwanted trash.

What are Some Examples of the Results of Poor Trip Planning?

- A group that is inexperienced or unfamiliar with the geography of an area may put people at risk by traveling through areas susceptible to flash floods or along ridge tops vulnerable to lightning activity. Groups traveling arid lands often fail to carry adequate water or a way of purifying water from natural sources. Checking with local land managers and studying maps and weather conditions can contribute to a low-risk existence.
- A poorly prepared group may plan to cook meals over a campfire only to discover upon arrival at their destination that a fire ban is in effect or that firewood is in scarce supply. Such groups often build a fire anyway breaking the law or impacting the land simply because they have not planned for alternatives. Fire bans and scarce wood supplies are signs that an area is experiencing the cumulative effects of heavy recreation use.
- A group that has failed to develop good travel plans may be unable to travel as fast as expected. The terrain may be too steep or the trails too rugged. These groups often resort to setting up camp late at night, sometimes in an unsafe location. Poor campsite selection usually leads to unnecessary resource damage. In addition, the group may never even reach their planned destination.

2. Travel and Camp on Durable Surfaces

Travel on Durable Surfaces

The goal of backcountry travel is to move through the backcountry while avoiding damage to the land. Understanding how travel causes impacts is necessary to accomplish this goal.

Travel damage occurs when surface vegetation or communities of organisms are trampled beyond recovery. The resulting barren area leads to soil erosion and the development of undesirable trails. Backcountry travel may involve travel over both trails and off-trail areas.

Travel on Trails: Concentrate activities when traveling in heavily used areas. Land management agencies construct trails in backcountry areas to provide identifiable routes that concentrate foot and stock traffic. Constructed trails are themselves an impact on the land; however, they are a necessary response to the fact that people travel in the back country. Concentrating travel on trails reduces the likelihood that multiple routes will develop and scar the landscape. It is better to have one well-designed route than many poorly chosen paths.

Trail use is recommended whenever possible. Encourage travelers to stay within the width of the trail and not short cut trail switchbacks (trail zigzags that climb hillsides). Travelers should provide space for other hikers if taking breaks along the trail. The principles of off-trail travel should be practiced if the decision is made to move off-trail for breaks.

(Hikers in the same group should periodically stop to rest and talk. Avoid shouting to communicate while hiking. Loud noises usually are not welcome in natural areas.)

Travel Off-trail: Spread Use and Impact in Pristine Areas (except in some desert areas) All travel that does not utilize a designed trail such as travel to remote areas, searches for bathroom privacy, and explorations near and around campsites is defined as off-trail. Two primary factors increase how off-trail travel affects the land: durability of surfaces and vegetation, and frequency of travel (or group size). *Durability* refers to the ability of surfaces or vegetation to withstand wear or remain in a stable condition. *Frequency* of use and large group size increase the likelihood that a large area will be trampled, or that a small area will be trampled multiple times.

Surface Durability: The concept of durability is an important one for all backcountry travelers to understand. The following natural surfaces respond differently to backcountry travel.

- Rock, sand and gravel: These surfaces are highly durable and can tolerate repeated trampling and scuffing. (However, lichens that grow on rocks are vulnerable to repeated scuffing).

- **Ice and snow:** The effect of travel across these surfaces is temporary, making them good choices for travel assuming good safety precautions are followed and the snow layer is of sufficient depth to prevent vegetation damage.
- **Vegetation:** The resistance of vegetation to trampling varies. Careful decisions must be made when traveling across vegetation. Select areas of durable vegetation, or sparse vegetation that is easily avoided. Dry grasses tend to be resistant to trampling. Wet meadows and other fragile vegetation quickly show the effects of trampling. Trampling encourages new travelers to take the same route and leads to undesirable trail development. As a general rule, travelers who must venture off-trail should spread out to avoid creating paths that encourage others to follow. Avoid vegetation whenever possible, especially on steep slopes where the effects of off-trail travel are magnified.
- **Cryptobiotic crust:** Cryptobiotic crust, found in desert environments, is extremely vulnerable to foot traffic. Cryptobiotic crust consists of tiny communities of organisms that appear as a blackish and irregular raised crust upon the sand. This crust retains moisture in desert climates and provides a protective layer preventing erosion. One footstep can destroy such soils. It is important to use developed trails in these areas. Travel across cryptobiotic crust should only be used when absolutely necessary. Walk on rocks or other durable surfaces if you must travel off-trail. In broad areas of cryptobiotic crust, where damage is unavoidable, it is best to follow in one another's footsteps so the smallest area of crust is affected—exactly the opposite rule from travel through vegetation. (Cryptobiotic crust is also extremely vulnerable to mountain bicycle travel.)
- **Desert puddles and mud holes:** Water is a precious scarce resource for all living things in the desert. Don't walk through desert puddles, mud holes, or disturb surface water in any way. Potholes are also home to tiny desert animals.



Camp on Durable Surfaces

Selecting an appropriate campsite is perhaps the most important aspect of low-impact backcountry use. It requires the greatest use of judgment and information and often involves making trade-offs between minimizing ecological and social impacts. A decision about where to camp should be based on information about the level and type of use in the area, the fragility of vegetation and soil, the likelihood of wildlife disturbance, an assessment of previous impacts, and your party's potential to cause or avoid impact.

Choosing a Campsite in High-Use Areas: Avoid camping close to water and trails and select a site which is not visible to others. Even in popular areas the sense of solitude can be enhanced by screening campsites and choosing an out-of-the-way site. Camping away from the water's edge also allows access routes for wild life. Be sure to obey regulations related to campsite selection. Allow enough time and energy at the end of the day to select an appropriate site. Fatigue, bad weather, and late departure times are not acceptable excuses for choosing poor or fragile camp sites.

Generally, it is best to camp on sites that are so highly impacted that further careful use will cause no noticeable impact. In popular areas, these sites are obvious because they have already lost their vegetation cover. Also, it is often possible to find a site which naturally lacks vegetation, such as exposed bedrock or sandy areas.

On high-impact sites, tents, traffic routes, and kitchen areas should be concentrated on already impacted areas. The objective is to confine impact to places which already show use and avoid enlarging the area of disturbance. When leaving camp, make sure that it is clean, attractive, and appealing to other campers who follow.

Camping in Undisturbed Remote Areas: Pristine areas are usually remote, see few visitors, and have no obvious impacts. Visit these special places only if you are committed to, and highly skilled in, Leave No Trace techniques.

Camping in Pristine Sites: it is best to spread out tents, avoid repetitive traffic routes, and move camp every night. The objective is to minimize the number of times any part of the site is trampled. In setting up camp, disperse tents and the kitchen on durable sites. Wear soft shoes around camp. Minimize activity around the kitchen and places where packs are stashed. The durable surfaces of large rock slabs make

good kitchen sites. Watch where you walk to avoid crushing vegetation and take alternate paths to water. Minimize the number of trips to water by carrying water containers. Check regulations, but camping 200 feet (70 adult steps) from water is a good rule of thumb.

When Breaking Camp: take time to naturalize the site. Covering scuffed areas with native materials (such as pine needles), brushing out footprints, and raking matted grassy areas with a stick will help the site recover and make it less obvious as a campsite. This extra effort will help hide any indication where you camped and make it less likely that other backcountry travelers will camp in the same spot. The less often a pristine campsite is used, the better chance it has of remaining pristine. Camping in Arid Lands - The most appropriate campsites in arid lands are on durable surfaces, such as rock and gravel, or on sites that have been so highly impacted further use will cause no additional disturbance. Previously impacted sites are obvious because they have already lost their vegetation cover or the rocky soils have been visibly disturbed. If choosing this type of site, make sure your spot is large enough to accommodate your entire group.

A Pristine Campsite: with no evidence of previous use, is appropriate in arid lands provided it is on a non-vegetated, highly resistant surface. Expanses of rock, gravel or sand are all excellent choices. It should never be necessary to camp on cryptobiotic soil, islands of vegetation, or within the precious green ribbons of desert creeks or streams. Beware when camping on sandy river bottoms and areas susceptible to flash floods.

Cooking Areas, Tents, and Backpacks: should be located on rock, sand, or gravel. Consciously choose durable routes of travel between parts of your camp so that connecting trails do not develop. Vary your routes since the objective is to minimize the amount of trampling and compaction on any specific part of the campsite. Limit your stay to no more than two nights.

Never Scrape Away or Clean Sites: of organic litter like leaves, and always minimize the removal of rocks and gravel. The organic litter will help to cushion trampling forces, limit the compatibility of soils, release plant nutrients, and reduce the erosive forces of rainfall. Disturbing the lichen-coated and varnished rocks known as desert pavement can leave a visible impact for hundreds of years. Once overturned, these rocks are difficult to replace and the lichens and varnish will not grow back within our lifetime.

Camping in River Corridors: River corridors are narrow strips of land and water with little room to disperse human activities. Campsites are often designated. It is generally best to camp on established sites located on beaches, sandbars, or non-vegetated sites below the high-water line.

3. Dispose of Waste Properly

Pack it in, pack it out. This common saying is a simple yet effective way to get backcountry visitors to take their trash home with them. There is no reason why people cannot carry out of the backcountry the extra food and packing materials which they carried in with them in the first place. The litter situation in many backcountry areas is better than it was 10-20 years ago; however, litter continues to be a problem. Though most trash and litter in the backcountry is not significant in terms of the long term ecological health of an area, it does rank high as a problem in the minds of many backcountry visitors. Trash and litter are primarily social impacts which can greatly detract from the naturalness of an area.

Reduce Litter at the Source

Much backcountry trash and litter originates from food items. Perhaps the easiest way to practice the principle of Pack it In, Pack it Out is to plan ahead and prepare. It is possible to leave most potential trash at home if you take the time to properly prepare food supplies. Reduce the volume of trash you have to pack out and save weight by repackaging solid food into plastic bags and liquids into reusable containers. Another good idea is to keep your menu simple: for short trips, consider not taking a stove and taking only food that requires no cooking. This significantly reduces backpack weight and excess food packaging taken into the backcountry.

Your first preference for dealing with trash should be to pack it out. Much trash is non able and not all outdoor settings are acceptable for building fires. Areas are often closed to fires due to high fire hazards or excessive campsite damage. Some areas, such as desert settings, are impractical for fires due to the scarcity of firewood.



Under no circumstance should food scraps be buried! Discarded or buried food scraps becomes attractive to small animal life which live in the area. It is common to see chipmunks, ground squirrels, and various species of birds gathering around camp kitchens. These camp robbers have become habituated to campers as a food source. Human food is not natural to wild animals and their natural feeding cycles and habits have become disturbed. A contentious no-trace camper always keeps a clean camp.

Special Considerations for Bear Country

When traveling in bear country, whether there are black bears or grizzly bears present, the disposal of garbage takes on a new significance. The primary concern here is safety, both for the visitor and for the bear. Personal safety is the first priority; a bear can be a very dangerous animal if provoked or habituated to humans. Safety of the bear is also a concern. Once a bear is habituated to people, usually because it associates people with food, it can rapidly become a problem bear and will have to be dealt with actively, sometimes at the expense of its life. Though black bears present less of a threat to the personal safety of backcountry visitors than grizzly bears, the potential for personal injury does exist and preparations should be taken.

Remember to pack it in, pack it out, and recycle. Properly dispose of what you can't pack out.

Minimize Human Impacts

Human Waste: Proper disposal of human waste is important to avoid pollution of water sources, avoid the negative implications of someone else finding it, minimize the possibility of spreading disease, and maximize the rate of decomposition.

In most locations, burying human feces in the correct manner is the most effective method to meet these criteria. Solid human waste must be packed out from some places, such as narrow river canyons. Land management agencies can advise you of specific rules for the area you plan to visit.

Contrary to popular opinion, research indicates that burial of feces actually slows decomposition (at least in the Rocky Mountains). Pathogens have been discovered to survive for a year or more when buried. However, in light of the other problems associated with feces, it is still generally best to bury it. The slow decomposition rate causes the need to choose the correct location, far from water, campsites, and other frequently used places.

Catholes: Catholes are the most widely accepted method of waste disposal. Locate catholes at least 200 feet (about 70 adult steps) from water, trails and camp. Select an inconspicuous site where other people will be unlikely to walk or camp. With a small garden trowel, dig a hole 6-8 inches deep and 4-6 inches in diameter. The cathole should be covered and disguised with natural materials when finished. If camping in the area for more than one night, or if camping with a large group, cathole sites should be widely dispersed.

Perhaps the most widely accepted method of backcountry human waste disposal is the cathole. The following are the advantages of catholes:

1. They are easy to dig in most areas.
2. They are easy to disguise after use.
3. They are private.
4. They disperse the waste rather than concentrate it (which enhances decomposition).
5. It is usually easy to select an out of the way location where you can be certain no one is going to casually encounter the cathole.

Selecting a Cathole Site:

1. Select a cathole site far from water sources, 200 feet (approximately 70 adult paces) is the recommended range.
2. Select an inconspicuous site untraveled by people. Examples of cathole sites include thick undergrowth, near downed timber, or on gentle hillsides.
3. If camping with a group or if camping in the same place for more than one night, disperse the catholes over a wide area; don't go to the same place twice.
4. Try to find a site with deep organic soil. This organic material contains organisms which will help decompose the feces. (Organic soil is usually dark and rich in color.) Refer to the jars used to demonstrate decomposition. The desert does not have as much organic soil as a forested area. (See number 2 under Digging a Cathole below.)
5. If possible, locate your cathole where it will receive maximum sunlight. The heat from the sun will aid decomposition.
6. Choose an elevated site where water would not normally during runoff or rain storms. The idea here is to keep the feces out of water. Over time, the decomposing feces will percolate into the soil before reaching water sources.

Digging a Cathole:

1. A small garden trowel is the perfect tool for digging a cathole.
2. Dig the hole 6-8 inches deep (about the length of the trowel blade) and 4-6 inches in diameter. In a hot desert, human waste does not biodegrade easily because there is little organic soil to help break it down. In the desert, the cathole should be only 4-6 inches deep. This will allow the heat and sun to hasten the decay process.
3. When finished, the cathole should be filled with the original dirt and disguised with native materials.

Catholes in Arid Lands: A cathole is the most widely accepted means of waste disposal in arid lands. Locate catholes at least 200 feet (about 70 adult steps) from water, trails, and camp. Avoid areas where water visibly flows, such as sandy washes, even if they are dry at the moment. Select a site that will maximize exposure to the sun in order to aid decomposition. Because the sun's heat will penetrate desert soils several inches, it can eventually kill pathogens if the feces are buried properly. South-facing slopes and ridge tops will have more exposure to sun and heat than other areas.

Latrines: Though catholes are recommended for most situations, there are times when latrines may be more applicable, such as when camping with young children or if staying in one camp for longer than a few nights. Use similar criteria for selecting a latrine location as those used to locate a cathole. Since this higher concentration of feces will decompose very slowly, location is especially important. A good way to speed decomposition and diminish odors is to toss in a handful of soil after each use. Ask your land manager about latrine-building techniques.

Toilet Paper: Use toilet paper sparingly and use only plain, white, non-perfumed brands. Toilet paper must be disposed of properly! It should either be thoroughly buried in a cathole or placed in plastic bags and packed out. Natural toilet paper has been used by many campers for years. When done correctly, this method is as sanitary as regular toilet paper, but without the impact problems. Popular types of natural toilet paper include stones, vegetation and snow. Obviously, some experimentation is necessary to make this practice work for you, but it is worth a try! Burning toilet paper in a cathole is not generally recommended.

Toilet Paper in Arid Lands: Placing toilet paper in plastic bags and packing it out as trash is the best way to Leave No Trace in a desert environment. Toilet paper should not be burned. This practice can result in wild fires.

Tampons: Proper disposal of tampons requires that they be placed in plastic bags and packed out. Do not bury them because they don't decompose readily and animals may dig them up. It will take a very hot, intense fire to burn them completely.

Urine: Urine has little direct effect on vegetation or soil. In some instances urine may draw wildlife which are attracted to the salts. They can defoliate plants and dig up soil. Urinating on rocks, pine needles, and gravel is less likely to attract wildlife. Diluting urine with water from a water bottle can help minimize negative effects.



Special Considerations for River Canyons: River canyons often present unique Leave No Trace problems. The most common practice is to urinate directly in the river and pack out feces in sealed boxes for later disposal. Check with your land manager for details about specific areas.

4. Leave What You Find

Allow others a sense of discovery by leaving rocks, plants, archaeology artifacts and other objects of interest as you find them.

The activities for this Leave No Trace principle deal with cultural artifacts; however, leave what you find involves many aspects of outdoor use. The following information addresses a variety of ways to respect natural settings.

Minimize Site Alterations

Leave areas as you found them. Do not dig trenches for tents or construct lean-tos, tables, chairs, or other rudimentary improvements. If you clear an area of surface rocks, twigs or pine cones, replace these items before leaving. On high impact sites, it is appropriate to clean up the site. Consider the idea that good campsites are found and not made.

In many locations, properly located and legally constructed facilities, such as a single fire ring, should be left. Dismantling them will cause additional impact because they will be rebuilt with new rocks and thus impact a new area. Learn to evaluate all situations you find.

Avoid Damaging Live Trees and Plants

Avoid hammering nails into trees for hanging things, hacking at them with hatchets and saws, or tying tent guy lines to trunks, thus girdling the tree. Carving initials into trees is unacceptable. The cutting of boughs for use as sleeping pads creates minimal benefit and maximum impact. Lightweight sleeping pads are available at stores catering to campers.

Picking a few flowers does not seem like it would have any great impact and, if only a few flowers were picked, it wouldn't. But, if every visitor thought to just take a few, a much more significant impact might result. Take a picture or sketch the flower instead of picking it. Experienced campers may enjoy an occasional edible plant, but they are careful not to deplete the surviving vegetation or disturb plants that are rare or are slow to reproduce.

Leave Natural Objects and Cultural Artifacts

Natural objects of beauty or interest such as antlers, petrified wood, or colored rocks add to the mood of the backcountry and should be left so others can experience a sense of discovery. In National Parks and some other areas it is illegal to remove natural objects.

The same ethic is applicable to cultural artifacts found on public land. Cultural artifacts are protected by the Archaeological Resources Protection Act. It is illegal to remove or disturb archeological sites, historic sites, or artifacts such as pot sherds, arrowheads, structures, and even antique bottles found on public lands.

5. Minimize Campfire Impacts

Fires vs. Stoves

The use of campfires, once a necessity for cooking and warmth, is steeped in history and tradition. Some people would not think of camping without a campfire. Campfire building is also an important skill for every camper. Yet, the natural appearance of many areas has been degraded by the overuse of fires and an

increasing demand for firewood. The development of light weight efficient camp stoves has encouraged a shift away from the traditional fire. Stoves have become essential equipment for minimum-impact camping. They are fast, flexible, and eliminate firewood availability as a concern in campsite selection. Stoves operate in almost any weather condition, and they Leave No Trace.

Should You Build a Fire?

- The most important consideration to be made when deciding to use a fire is the potential damage to the backcountry.
- What is the fire danger for the time of year and the location you have selected? Are there administrative restrictions from the agency that administers the area?
- Is there sufficient wood so its removal will not be noticeable?
- Does the harshness of alpine and desert growing conditions for trees and shrubs mean that the regeneration of wood sources cannot keep pace with the demand for firewood?
- Do group members possess the skill to build a campfire that will Leave No Trace?

Lessening Impacts When Campfires Are Used

Camp in areas where wood is abundant if building a fire. Choose not to have a fire in areas where there is little wood at higher elevations, in heavily used areas, or in desert settings. A true Leave No Trace fire shows no evidence of having been constructed.

Existing Fire Rings: The best place to build a fire is within an existing fire ring in a well-placed campsite. Keep the fire small and burning only for the time you are using it. Allow wood to burn completely to ash. Put out fires with water, not dirt. Dirt may not completely extinguish the fire. Avoid building fires next to rock outcrops where the black scars will remain for many years.

Mound Fire: Construction of a mound fire can be accomplished by using simple tools: a garden trowel, large stuff sack and a ground cloth or plastic garbage bag. To build this type of fire: Collect some mineral soil, sand, or gravel from an already disturbed source. The root hole of a toppled tree is one such source. Lay a ground cloth on the fire site and then spread the soil into a circular, flat-topped mound at least 3 to 5 inches thick. The thickness of the mound is critical to insulate the ground below from the heat of the fire. The ground cloth or garbage bag is important only in that it makes cleaning up the fire much easier. The circumference of the mound should be larger than the size of the fire to allow for the spreading of coals. The advantage of the mound fire is that it can be built on flat exposed rock or on an organic surface such as litter, duff or grass.

Fire Pans: Use of a fire pan is a good alternative for fire building. Metal oil drain pans and some backyard barbecue grills make effective fire pans. The pan should have at least three-inch-high sides. It should be elevated on rocks or lined with mineral soil so the heat does not scorch the ground.

Firewood And Cleanup: Standing trees, dead or alive, are home to birds and insects, so leave them intact. Fallen trees also provide bird and animal shelter, increase water holding capacity of the soil, and recycle nutrients back into the environment through decomposition. Stripping branches from standing or fallen trees also detracts from an area's natural appearance.

- Avoid using hatchets, saws, or breaking branches off standing or downed trees. Dead and down wood burns easily, is easy to collect and leaves less impact.
- Use small pieces of wood no larger than the diameter of an adult wrist that can be broken with your hands.
- Gather wood over a wide area away from camp. Use dry driftwood on rivers and sea shores.
- Burn all wood to white ash, grind small coals to ash between your gloved hands, thoroughly soak with water, and scatter the remains over a large area away from camp. Ashes may have to be packed out in river corridors.
- Replace soil where you found it when cleaning up a mound or pan fire.
- Scatter unused wood to keep the area as natural looking as possible.
- Pack out any campfire litter. Plastic items and foil-lined wrappers should never be burned in a campfire.

Safety

- Provide adequate supervision for young people when using stoves or fires.
- Follow all product and safety labels for stoves.
- Use approved containers for fuel.
- Never leave a fire unattended.
- Keep wood and other fuel sources away from fire.
- Thoroughly extinguish all fires.



6. Respect Wildlife

Learn about wildlife through quiet observation. Do not disturb wildlife or plants just for a “better look”. Observe wildlife from a distance so they are not scared or forced to flee. Large groups often cause more damage to the environment and can disturb wildlife so keep your group small. If you have a larger group, divide into smaller groups if possible to minimize your impacts.

Quick movements and loud noises are stressful to animals. Travel quietly and do not pursue, feed or force animals to flee. (One exception is in bear country where it is good to make a little noise so as not to startle the bears) In hot or cold weather, disturbance can affect an animals ability to withstand the rigorous environment. Do not touch, get close to, feed or pick up wild animals. It is stressful to the animal, and it is possible that the animal may harbor rabies or other diseases. Sick or wounded animals can bite, peck or scratch and send you to the hospital. Young animals removed or touched by well-meaning people may cause the animals parents to abandon them. If you find sick animals or animal in trouble, notify a game warden.

Considerate campers observe wildlife from afar, give animals a wide berth, store food securely, and keep garbage and food scraps away from animals. Remember that you are a visitor to their home.

Allow animals free access to water sources by giving them the buffer space they need to feel secure. Ideally, camps should be located 200 feet or more from existing water sources. This will minimize disturbance to wildlife and ensure that animals have access to their precious drinking water. By avoiding water holes at night, you will be less likely to frighten animals because desert dwellers are usually most active after dark. With limited water in arid lands, desert travelers must strive to reduce their impact on the animals struggling for survival.

Washing and human waste disposal must be done carefully so the environment is not polluted, and animals and aquatic life are not injured. Swimming in lakes or streams is okay in most instances, but in desert areas, leave scarce water holes undisturbed and unpolluted so animals may drink from them.

7. Be Considerate of Other Visitors

One of the most important components of outdoor ethics is to maintain courtesy toward other visitors. It helps everyone enjoy their outdoor experience. Many people come to the outdoors to listen to nature. Excessive noise, unleashed pets, and damaged surroundings take away from everyone’s experience. So, keep the noise level down while traveling, and if you bring a radio, tapes, or CDs, use headphones so you will not disturb others. Also keep in mind that the feeling of solitude, especially in open areas, is enhanced when group size is small, contacts are infrequent, and behavior is unobtrusive. To maximize your feeling of privacy, avoid trips on holidays and busy weekends, or take a trip during the off season.

Groups leading or riding livestock have the right-of-way on trails. Hikers should move off the trail to the downhill side. Talk quietly to the riders as they pass, since horses are spooked easily. Take rest breaks on durable surfaces well off the designated trail. Keep in mind that visitors to seldom used places require an extra commitment to travel quietly and lightly on the land.

When selecting a campsite, choose a site where rocks or trees will screen it from others view. Keep noise down in camp so as not to disturb other campers or those passing by on the trail. “Goofing off” or “pranks” are undesirable social behavior and may lead to serious or fatal injuries. Also “events” need to fit the setting—save game playing for the city park. Bright clothing and equipment, such as tents that can be seen for long distances, are discouraged. Especially in open natural areas, colors such as dayglow yellow

are disturbing and contribute to a crowded feeling; choose earth-toned colors (i.e., browns and greens) to lessen visual impacts.

Keep pets under control at all times. Bowser is not in the wildlife category. Dogs running free can be unwelcome, frightening people, or leaving behind unwanted “presents.” Please pick up dog feces from camps and trails. Some areas prohibit dogs or require them to be on a leash at all times.

Leave gates as you find them, and leave the land undisturbed for others to enjoy. Remember, our open spaces and wildlands are protected for all generations. It is up to us to keep them healthy, beautiful, and open to the public for recreation, reflection, and revitalization! Enjoy and learn from historical and archeological sites, but respect these sites and treasures. Some of these are sacred to Native Americans, or are important cultural reminders of our heritage.